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EXAMINER	
FOX, BRYAN J	

ART UNIT	PAPER NUMBER
2686	6

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/989,779	MILLER LL ET AL.	
	Examiner	Art Unit	
	Bryan J Fox	2686	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 8-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 recites the limitation "the packet burst" in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitation "the first and second signals" in lines 8-9. There is insufficient antecedent basis for this limitation in the claim. If "the first and second signals" are the same as "the first and second signal bursts", please name them accordingly.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, 8, 9, 11, 13, 15, 16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Suzuki (US005787122A).

Regarding claim 1, Suzuki discloses a reception system where an amplifier 73, a demodulator 74, a deinterleave circuit 75 and a decoder 76 are coupled to one of a

plurality of antennas 71a-m via switch 72s, which reads on the claimed "first and second antennas connected to RF processing circuitry by an RF switch", where each time the antenna switcher 72 receives burst data, the antenna switches the antenna under control of the communication control unit 78 (see column 9, lines 13-20 and figure 10), which reads on the claimed "an RF switch control switched incrementally in response to a sequence of scheduled packet bursts".

Regarding claim 4, Suzuki discloses that an encoded signal dispersed into a plurality of symbols interleaved over a plurality of burst data (see column 8, line 62 – column 9, line 12), so the burst data are related as claimed. Each time the antenna switcher 72 receives burst data, the antenna switches the antenna under control of the communication control unit 78 (see column 9, lines 13-20 and figure 10), which reads on the claimed "the antennas are switched so that each antenna receives a related packet burst".

Regarding claim 8, Suzuki discloses a reception system that receives an encoded signal dispersed into a plurality of symbols interleaved over a plurality of burst data (see column 8, line 62 – column 9, line 12), where each time the antenna switcher 72 receives burst data, the antenna switches the antenna under control of the communication control unit 78 (see column 9, lines 13-20 and figure 10), which reads on the claimed "receiving the packet burst individually at a plurality of antennas". If a signal is dispersed into a plurality of symbols interleaved over a plurality of burst data, it must be transmitted as such, which reads on the claimed "transmitting a message contained within a plurality of packet bursts at spaced time intervals".

Regarding claim 9, Suzuki discloses that one antennas 71a-m at a time is connected to the receiver circuitry 73-76 (see figure 10), and that the antennas may be selected in the previously-determined sequential order (see column 9, lines 21-24), which reads on the claimed "each of the plurality of the antennas is connected to a radio receiver at separate times relative to other receiving antennas".

Regarding claim 11, Suzuki discloses a system where an encoded signal dispersed into a plurality of symbols interleaved over a plurality of burst data (see column 8, line 62 – column 9, line 12), which reads on the claimed "a message is spread across the plurality of packet bursts by space-time coding".

Regarding claim 13, Suzuki discloses a transmission/reception system where both a transmitter and a receiver are selectively coupled to a plurality of antennas (see figure 10, which reads on the claimed "communication system for coupling a transmitter and a receiver", and receives an encoded signal dispersed into a plurality of symbols interleaved over a plurality of burst data (see column 8, line 62 – column 9, line 12), where each time the antenna switcher 72 receives burst data, the antenna switches the antenna under control of the communication control unit 78 (see column 9, lines 13-20 and figure 10), which reads on the claimed "adapted for receiving at least first and second signal bursts by first and second antennas respectively, and responding to the two signal bursts to communicate a singly unified message at the receiver", and "the first and second signal bursts are sequentially separated in time; the first and second antennas are sequentially enabled to communicate to storage at the receiver" where the output terminal 77 receiving the demodulated, deinterleaved, decoded data (See figure

10) reads on the claimed "storage at the receiver". The processing of the reception signal includes deinterleave processing for deinterleaving the switched signal over a plurality of burst data to provide data in the original order (see column 9, lines 45-53), which reads on the claimed "enabling a representation of the unified message by responding to the first and second signals".

Regarding claim 15, Suzuki discloses that the plurality of symbols are part of the same signal (see column 8, line 62 – column 9, line 12), which reads on the claimed "the first and second signal bursts are each a part of a space-time coded message spread across two bursts". The processing of the reception signal includes deinterleave processing for deinterleaving the switched signal over a plurality of burst data to provide data in the original order (see column 9, lines 45-53), which reads on the claimed "a common message is derived from the sequential signal bursts received by the first and second antennas".

Regarding claim 16, Suzuki discloses that the reception signal is deinterleaved by deinterleaving circuit 75 so that it is reconverted into the original data (see column 9, lines 31-35), which reads on the claimed "enabling includes retaining the first an second signal bursts in a storage medium and processing to deliver the single unified message".

Regarding claim 18, Suzuki discloses that the processing of the reception signal includes deinterleave processing for deinterleaving the switched signal over a plurality of burst data to provide data in the original order (see column 9, lines 45-53) and that the burst data are received on a plurality of antennas (see column 9, lines 18-20), which

reads on the claimed "deriving the common message includes selecting a message from one of the receiving antennas".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 2, 3 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Aaronson et al (US006363062B1).

Regarding claim 2, Suzuki fails to expressly disclose the use of a MAC protocol.

Aaronson et al discloses a radio system where the MAC layer schedules communication bursts (see column 4, lines 22-63) taking into account factors such as propagation delay between the different nodes, queuing of data and synchronization of the time transmitting from multiple nodes (see column 3, lines 22-30).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Suzuki with Aaronson et al to include the above MAC layer in order to use the advantages of a MAC protocol such as more efficient use of the spectrum at a given region as suggested by Aaronson et al (see column 3, line 66 – column 4, line 2).

Regarding claim 3, the combination of Suzuki and Aaronson et al discloses that the MAC algorithm should synchronize the time of transmitting from multiple nodes (see column 3, lines 22-29), which reads on the claimed "MAC processor is synchronized with transmission of a base station".

Regarding claim 12, Suzuki discloses that transmission data is encoded by encoder 22 and interleaved by an interleaver 23 under control of a communication control unit 28 which controls transmission processing, which reads on the claimed "signal processing". Suzuki fails to expressly disclose the use of a protocol.

Aaronson et al discloses a radio system where the MAC layer schedules communication bursts (see column 4, lines 22-63) taking into account factors such as propagation delay between the different nodes, queuing of data and synchronization of the time transmitting from multiple nodes (see column 3, lines 22-30).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Suzuki with Aaronson et al to include the above MAC layer in order to use the advantages of a MAC protocol such as more efficient use of the spectrum at a given region as suggested by Aaronson et al (see column 3, line 66 – column 4, line 2).

Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohashi et al in view of Khayrallah (XP-000889044).

Regarding claim 5, Ohashi discloses a diversity radio communication system where an antenna switch circuit 10 switches the first and second antennas 11 and 12 to connect them to the transmit/receive switch circuit 9 (see page 6, lines 1-8), which reads on the claimed "receiving communications from a transceiver at a transmission station by wireless transceivers at receiving stations having switched protocol diversity reception operational modes", and uses this configuration to receive data from first and second antennas. The received data is stored in the temporary memory 2 of the memory 3 (see page 6, lines 38-40), which reads on the claimed "recording the received bursts as soft information in a storage medium". Ohashi et al fails to expressly disclose the combining of information.

Khayrallah discloses an improvement of time-diversity methods where a receiver cycles through groups of antennas and the antennas within a group are combined by the receiver chains (see paragraph 3), which reads on the claimed "combining the soft information from the first and second bursts into a single message". Furthermore, Khayrallah discloses that antenna switching is preferably bur not necessarily done before a new slot is to be received, which reads on the claimed "enabling a first antenna to receive a first packet burst; enabling a second antenna to receive a second packet burst".

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Ohashi et al with Khayrallah to include the above combining of

data in order to improve the time-diversity methods as suggested by Khayrallah (see the title).

Regarding claim 6, the combination of Ohashi et al and Khayrallah discloses that when a detected error is uncorrectable, the terminal unit on the receiver side recognizes it as a receiving error and sends a response indicating the error to the transmitter side, requesting re-transmission of the same data, and the same data is re-transmitted (see Ohashi et al page 10, line 57 – page 11, line 2) and simultaneously, the receiving error count is increased by 1 and the receiving antenna is switched (see Ohashi et al page 11, lines 39-47), so in this case the same data would be received by two different antennas as claimed.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohashi et al in view of Khayrallah as applied to claim 5 above, and further in view of Suzuki.

Regarding claim 7, the combination of Ohashi et al and Khayrallah fails to expressly disclose a message spread across packet bursts.

Suzuki discloses a system that receives an encoded signal dispersed into a plurality of symbols interleaved over a plurality of burst data (see column 8, line 62 – column 9, line 12), which reads on the claimed "each packet burst contains a portion of a space-time coded message spread across the first and second packet bursts".

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Ohashi et al and Khayrallah with Suzuki to include the above signal dispersed into a plurality of symbols in order to use the advantages of burst signals such as the fact that transmission data are dispersed and

thus can be transmitted from a plurality of antennas which improves the S/N of the reception signal as suggested by Suzuki (see column 8, lines 12-18 and figure 5).

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Struhsaker et al (US 20020141355A1).

Regarding claim 10, Suzuki fails to expressly disclose that each packet burst includes a complete message.

Struhsaker et al discloses that a packet data unit may be a complete packet transmission or a fragment of a much larger message (see page 12, paragraph 159).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Suzuki with Struhsaker et al to include the above inclusion of a complete message in a packet burst in order to avoid wasting bandwidth with additional MAC headers as suggested by Struhsaker et al (see page 12, paragraph 159).

Claims 14, 17 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Ohashi et al.

Regarding claim 14, Suzuki fails to expressly disclose that signal bursts would include identical packets.

Ohashi et al discloses that when a detected error is uncorrectable, the terminal unit on the receiver side recognizes it as a receiving error and sends a response indicating the error to the transmitter side, requesting re-transmission of the same data, and the same data is re-transmitted (see page 10, line 57 – page 11, line 2), which reads on the claimed "first and second signal bursts are identical packets of a common message".

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Suzuki with Ohashi et al to include the above retransmission of the same data in order to prevent the loss of data.

Regarding claim 17, the combination of Suzuki et al and Ohashi et al discloses a system where, when an error is detected, the antenna is switched and the information is re-transmitted (see page 1, line 57 – page 11, line 2), which reads on the claimed "selecting a message from one of the receiving antennas".

Regarding claim 21, Suzuki fails to expressly disclose sending a message to the transmitting end to cease further bursts.

Ohashi et al discloses a system where, when an error occurs, a response indicating the error is sent to the transmitting end, requesting re-transmission of the same data (see page 10, line 57 – page 11, line 2), and this process is continued until a re-transmission upper-limit is reached (see page 11, lines 5-14). If no error occurs, no message requesting re-transmission is sent.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Suzuki with Ohashi et al to include the above re-transmission in order to avoid the loss of data. The combination of Suzuki and Ohashi et al fails to disclose the sending of a message to cease re-transmissions. This difference is not critical to the invention however, and it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Suzuki and Ohashi et al to operate such that, instead of a message requesting retransmission being sent, a message ceasing retransmission is sent.

Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki in view of Sampath et al (US 20030012308A1).

Regarding claim 19, Suzuki discloses a system where the number of transmit antennas corresponds to the number of receive antennas (see figure 12). Suzuki fails to disclose the notification of the number of antennas.

Sampath et al discloses a system where a characteristic signal generator 450 generates a characteristic signal, based on one or more estimated system characteristics and/or deterministic system characteristics, such as number of transmit antennas, spatial configuration of the transmit antennas and transmit diversity mode (see page 4, paragraph 50).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Suzuki with Sampath et al to include the above notification in order to perform better channel estimation in a broad range of system environments which leads to advantages such as higher decoding error rates, lower information transmission rates and/or lower signal to noise ratios as suggested by Sampath et al (see page 1, paragraphs 10 and 11).

Regarding claim 20, Suzuki fails to expressly disclose the notification of supporting a protocol-assisted diversity operations.

Sampath et al discloses a system where some slots provide header information for the frame, such as whether spatial multiplexing or transmit diversity is enabled for the frame (see page 3, paragraph 40), which reads on the claimed "a receiver notifying a transmitter that it accepts and responds to protocol-assisted diversity operations".

It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Suzuki with Sampath et al to include the above notification in order to perform better channel estimation in a broad range of system environments which leads to advantages such as higher decoding error rates, lower information transmission rates and/or lower signal to noise ratios as suggested by Sampath et al (see page 1, paragraphs 10 and 11).

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Vaisanen et al (US006560443B1) discloses an antenna sharing switching circuitry for multi-transceiver mobile terminal and method therefore:

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bryan J Fox whose telephone number is (703) 305-8994. The examiner can normally be reached on Monday through Friday 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marsha Banks-Harold can be reached on (703) 305-4379. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BJF

Nguyen Vo

6-07-2004

NGUYEN T. VO
PRIMARY EXAMINER